

ENVIRONMENTAL Fact Sheet



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Functional Assessments for Wetlands and Other Aquatic Resources

Under New Hampshire wetlands rules, a functional assessment must be done for any project classified as **minor** or **major** impact (Env-Wt 311.03(b)(10)). The assessment must be done by a certified wetland scientist (or for coastal projects by a qualified coastal professional, see Env-Wt 602.43). Information from the assessment is used by the applicant to evaluate the impacts to jurisdictional areas from a proposed project. The applicant must design the project to avoid and minimize impacts to wetland resources and address how avoidance and minimization was achieved to meet permitting requirements.

A **Functional Assessment** requires a desktop and field evaluation of aquatic resources in an area or on a parcel to determine the functions and values of those resources following a consistent scientific method.

What are Aquatic Resource Functions and Values and Why Are They Important?

The biological, physical and geochemical processes that occur within wetlands, streams and lakes provide important ecosystem services that benefit humans. These ecosystem services are called **Functions and Values**. These aquatic resources provide water purification and storage, wildlife habitat, and recreation, flood control, and recreational opportunities. These resources are of significant importance to the state's economy and welfare. In order to maintain the high functions and values provided by these resources, it is crucial to protect them from alteration and degradation.

- **Functions** are the natural processes of a wetland, stream or vernal pool. They may depend on the specific aspects of the wetland, such as location, landscape position, geology, hydrology, size and plant community. Not all wetlands and other aquatic resources perform all functions, and not all functions are performed to an equal degree.
- **Values** are the benefits that functions provide to humans and are based on their quality or importance, to society.

For example, the physical characteristics of a wetland may cause the surface water to pond or move slowly, allowing suspended particles to settle out of the water, performing the **function** of retaining

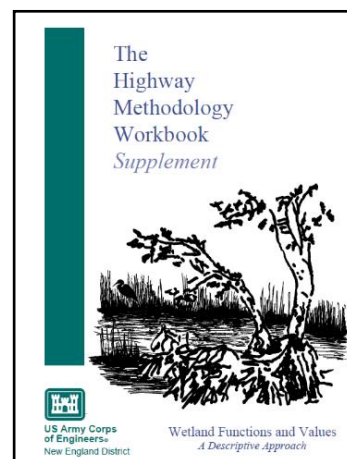


Figure 1 - This wetland retains water and sediment from runoff, allowing some pollutants time to settle out of the water.

sediments and toxicants. By clarifying the water, the wetland performs an important role in sustaining high water quality, which has a high **value** to society.

Method Used to Complete a Functional Assessment of Wetlands and Other Aquatic Resources

The wetland rules specify the method for evaluating aquatic resource functions and values in New England as the USACE *Highway Methodology Workbook* (1993) and the USACE *The Highway Method Workbook Supplement* (1999). However, the rules also state that an applicant may use an alternative method that is scientifically supported (with a cited reference) and the reasons for the alternative method substantiated (Env-Wt 311.10(a)(2)b). The method used depends on the type of aquatic resources being evaluated. All wetlands, streams, and vernal pools involved in a project must be assessed individually using methods appropriate to the aquatic resource type.



Major Functions and Values of Wetlands to Evaluate

In addition to the 13 functions and values considered in the *Highway Methodology Workbook Supplement*, is Ecological Integrity, a function that is included in RSA 482-A, the wetlands law. Numbered images match the numbered function or value below.

1. Ecological Integrity (from RSA 482-A). The ability of an aquatic resource to support and maintain a stable structure of a community of organisms having a specific composition, diversity, and functional organization comparable to that of the natural habitat of a region. Wetlands impaired by human disturbance in more developed settings (presence of roads, etc.) may provide a lower level of this function.



2. Educational/Scientific Value. The suitability of the wetland as a site for education and research.

3. Fish and Shellfish/ Aquatic Life Habitat. The quality of provide for fish, shellfish or other aquatic life in open water wetland or stream systems.

4. Flood Storage/Floodflow Alteration. The effectiveness of an aquatic resource to slow and store floodwaters following

precipitation events, thereby reducing downstream flooding.



5. Groundwater Recharge /Discharge. The potential for a wetland to recharge an underlying aquifer or serve as a discharge area at the headwaters of a stream.



6. Noteworthiness (Threatened and Endangered Species Habitat).

Evaluates the aquatic resource for its ability to support highest-ranked habitat by New Hampshire Fish and Game Department (NHFG) or to support threatened, rare, and endangered species and habitat.



7. Nutrient Removal

/Trapping/Retention and Transformation. The effectiveness of a wetland to retain and cycle nutrients, thereby reducing excess nutrients from entering downstream surface waters.

8. Production Export (Nutrient). The ability of an aquatic resource to produce food or usable products for humans or other living organisms.

9. Scenic Quality. The visual and aesthetic qualities of the wetland, stream, or vernal pool systems or wetland complexes.

10. Sediment/Toxicant Retention/ Trapping. The effectiveness of the aquatic resource system to remove and retain sediments, toxicants, or pathogens from runoff water draining from the surrounding upland.



11. Sediment/Shoreline Stabilization/Shoreline Anchoring.

The ability of the wetland or stream to provide a barrier and dissipate erosion when streambanks and shorelines are vegetated.

12. Uniqueness/Heritage. The special values a wetland or stream may have such as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

13. Wetland-based Recreation. The effectiveness of the wetland and associated watercourses or wetland systems and complexes to provide recreational opportunities such as canoeing, boating, fishing, hunting,



14. Wildlife Habitat. The suitability of the aquatic resource to provide habitat provided for animals typically associated with wetland systems, vernal pool complexes, surface waters, including the boundaries or edges of these systems, including both resident and migrating birds.



Evaluating Functions of Streams

While the *Highway Method Workbook Supplement* uses the term “wetland” in the descriptions of the various functions and descriptions of the considerations/qualifiers, most of the functions can be used in the qualitative evaluation of streams. Just as the Functional Assessment Worksheet (and USACE Wetland Function-Value Evaluation Form) provides a place to identify if a function is appropriate to the wetland (its “Suitability”), when evaluating a stream, the suitability of a function can be indicated as well. Other stream assessment methods may be used, such as the Natural Resources and Conservation Service (NRCS) Stream Visual Assessment v2 method.

Examples of several functions and how they can be assessed for streams are provided below.

Two online tools, the [Wetlands Permit Planning Tool \(WPPT\)](#) and the [Aquatic Restoration Mapper](#) (See NHDES Wetlands Bureau website) provide screening-level information for locations of expected coldwater fisheries, documented native brook trout, and other aquatic resources. NHFG fish survey maps also provide information on protected and cold water fisheries.

Ecological Integrity. The presence of stressors (such as disturbed areas and impervious surfaces) or their absence in a stream and surrounding landscape will provide an indication of this function for a stream. Evidence of sedimentation, or stormwater discharge to stream, presence of roads, dams, or culverts can provide an indication of stressors that would likely affect the ecological integrity of the stream. Many of these stressors will affect aquatic habitat complexity which would affect the wildlife habitat function, as well as nutrient retention, transformation and uptake. The presence of certain aquatic

macroinvertebrates can provide information about water quality (and quality of wildlife habitat). However, aquatic surveys conducted outside seasonal timeframes will not be representative of summer biota as submerged macrophytes, used by many macroinvertebrates, are seasonal in their occurrence and may not be a common feature of many streams, particularly those that are high gradient.

Flood Storage/Floodflow Alteration. This function is greater for a low gradient and sinuous stream, than for a steep headwater stream. It would also be greater for a stream with woody vegetation in the riparian zone or a mix of herbaceous and woody vegetation than where only herbaceous vegetation is present. Consideration of landscape context and watershed location is important in assessing this function.

Wildlife Habitat. This function is evaluated both within the stream and adjacent areas (banks). Higher level functions are likely where native vegetation thrive along the shoreline and where there is a tree canopy overhead are present. Other considerations would include the absence of barriers to aquatic organism passage. Habitat suitability is dependent on the diversity of bed substrate and substrate particle size, which varies with stream type. Aquatic habitat complexity (including the presence of woody material) may affect stream biota.

Evaluating Functions of Vernal Pools

Identification of amphibian and invertebrate indicator species and seasonal hydrology are to be evaluated using the following references consistent with the vernal pool definition (Env-Wt 104.44). Using this information, the functions and values of vernal pools in the landscape context can be evaluated, such as wildlife habitat and nutrient export. The Army Corps Vernal Pool Characterization form requires assessment of landscape setting, vernal pool condition, parent material, dominant vegetative community, canopy cover, predominant substrate, and pool size. The length of time and portion of the year a vernal pool holds water is important to assess. For more information, see the UNH study [The Importance of Hydroperiod in Wetland Assessment](#). Examples of some functions that are characteristic of vernal pools include the following:



Flood Storage/Floodflow Alteration. Small, depressional wetlands desynchronize floodwater.

Groundwater Recharge/Discharge includes surface water storage in the pool, subsurface water exchange, and surface water conveyance.

Nutrient Removal/Trapping/Retention and Transformation includes element cycling and removal (maintenance of water quality).

Production Export (Nutrient). Vernal pool amphibians provide an early spring food source for a variety of mammals and birds in the uplands thus contributing to nutrient export and cycling in the larger landscape.

Wildlife Habitat includes maintenance of characteristic vegetation and aquatic invertebrates, amphibian and avian populations, populations of sensitive taxa, and maintenance of habitat interspersed and connectivity.

The following documents can assist in to characterize vernal pools and provide a valuation for features of the pool and surrounding habitat. However, the definition in the wetlands rules applies (Env-Wt 104.44).

- ✓ [Identifying and Documenting Vernal Pools in New Hampshire](#), 3rd Ed. New Hampshire Fish and Game Department (2016).

- ✓ [Vernal Pool Assessment](#) and [Vernal Pool Characterization Form](#) dated 9/6/16 Appendix L of the USACE New England District Compensatory Mitigation Guidance.

Evaluating Functions of Coastal Resources: Tidal Wetlands, Waters and Associated Sand Dunes



A Coastal Functional Assessment (CFA) is required for minor and major impact projects that propose impacts to tidal wetlands, waters and associated sand dunes (Env-Wt 603.04).

The functions described in the *Workbook Supplement* can be applied to capture the unique nature of tidal wetlands and coastal resources. Considering that tidal wetlands are in limited supply and provide unique habitats, even a lower quality tidal marsh has significant value.

The [Method for the Evaluation and Inventory of Vegetated Tidal Marshes in New Hampshire \(Coastal Method\)](#) provides important information New Hampshire coastal functions:

Ecological Integrity function considers hydrologic modification, which for tidal wetlands includes tidal restrictions and ditching.

Finfish and Shellfish Habitat. While many fish, including American shad, Atlantic menhaden and striped bass, spend most of their lives in the ocean, they return to the brackish waters of estuaries to spawn.

Flood Storage and Floodflow Alteration includes consideration of the landscape features that protect upstream areas from storm surge. Coastal dunes prevent or delay flooding of inland areas by acting as a physical barrier against waves and storm surge.

Nutrient Removal/Trapping/Retention and Transformation. Salt marshes and submerged aquatic vegetation perform denitrification at higher rate than intertidal flats.

Shoreline Anchoring. Vegetated tidal marshes provide protection from erosion.

Wildlife Habitat is a significant function of tidal wetlands due to migratory pathways for birds. Habitat, nesting areas for rare plants or animals. Many birds depend on coastal sand dunes for breeding, migration or wintering, including the state endangered and federally threatened piping plover, horned lark and least tern.

After the Functional Assessment is Completed...

When designing a project, it is necessary to consider the functions and values of the aquatic resources (including associated sand dunes, where present), so an applicant can:

1. Select a location that will have the least amount of impact and loss of aquatic resource functions.
2. Design the project to have the least impact to wetland functions.
3. Where impacts are unavoidable, limit them to the least valuable functions on the site and avoid impacts to highest and most valuable value functions.
4. Include onsite minimization measures and construction management practices to protect aquatic resource functions.



For more information, visit the [Wetlands Bureau](#) website, email the Wetlands Bureau at Irm@des.nh.gov, or call the Wetlands Bureau at (603) 271-2147.